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AUTHOR Layng, Jacqueline M.
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ABSTRACT

The Illinois Mathematics and Science Academy (IMSA) in Aurora (Illinois) is a pioneering educational community, the nation's only three-year publicly funded residential high school. Its mission requires the achievement of two separate goals: (1) the education of the gifted young of Illinois in science and mathematics and (2) the sharing of innovative educational findings with other schools in Illinois. The academy opened in 1986 as part of the state's educational reform package. It currently houses 629 students, whose tuition and most of whose board expenses are provided by the state. Student assessment is through performance analyses, thinking logs, learning journals, and portfolios. Schedules, admissions procedures, the school's leadership program, and some details of the facilities are described. As part of its information-sharing mission, IMSA has produced video programs about innovative practices and events. One of the many possibilities of the institution is the increased use of visuals to share information and to help students. (Contains 6 references.) (SLD)

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IMSA-Enjoy the Journey

by Jacqueline Layng

Northern Illinois University
3417 Lanstrom Road
Rockford, IL 61107

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IMSA - Enjoy the Journey

Jacqueline M. Layng

The Illinois Mathematics and Science Academy located in Aurora, Illinois is a pioneering educational community. It is the nation's only three year publicly funded residential high school.

The mission of the Illinois Mathematics and Science Academy, "a community of scholars dedicated to intellectual exploration, is to develop leaders who know the joy of discovering and forging interconnections among mathematics, science, the arts and the humanities, and who, by example and instruction, inspire others to live in harmony with themselves, other human beings, and the physical world" (IMSA, 1993, pamphlet).

This mission statement requires IMSA to achieve two separate goals. The first is to educate the gifted young of Illinois in math and science. The second goal is to share innovative educational findings with other schools in Illinois. This paper will describe the history, academic program, admissions procedures and statewide leadership programs of the Illinois Mathematics and Science Academy. In particular, the paper will discuss IMSA's venture into video production and their journey from novice to professional programming

History

The Illinois Mathematics and Science Academy was developed by the Illinois State Assembly and former Gov. James Thompson as part of the educational reform package in Illinois. The original concept was created from a curriculum design workshop convened in 1983 by Dr. Leon M. Lederman, then the Director of Fermi National Accelerator Laboratory in Batavia, Illinois. The Illinois General Assembly established the academy through Senate Bill 730 and IMSA opened their doors September 7, 1986.

The academy started with, "210 students, 12 faculty members, nine

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resident counselors, 21 courses, no residence halls, no computers, no library books, limited funding and an uncertain future" (IMSA, 1993, p. 4). The Illinois General Assembly aided the academy with further funding to insure growth and stability. The Illinois Mathematics and Science Academy is governed by an appointed Board of Trustees and is required to submit budget requests to the Illinois Board of Higher Education.

The Illinois Mathematics and Science Academy's first class graduated and 629 students currently attend the academy. IMSA is also conveniently located 35 miles west of Chicago along the Illinois Research and Development Corridor, enabling students to interact with some of the world's leading scientific, research and educational innovators.

Academic Program

Curriculum

The academy's academic program offers courses in mathematics, science, art and humanities. Courses emphasize interconnection between and among the various disciplines. Courses are prescribed for sophomores, juniors take a combination of prescribed and elective courses and seniors design an all-elective schedule based on individual interest and graduation requirements. Example of courses are: Facts of Thermodynamics, Pathogenic Microbiology, Differential Equations, Concert Band and Physical Education: Lifetime Activities.

in June of 1989 and the academy's environment had increased a great deal. By 1989, IMSA had 55 faculty members, 22 resident counselors, 127 courses, five completed residence halls and two under construction, approximately 20,000 library books, 300 computers, an impressive record of student achievements and a collaborative outreach program.

Tuition and most board expenses are provided by the state of Illinois. The approximate cost per student is $15,000

Assessment

Neither grade point averages nor class ranking are used at the Illinois Mathematics and Science Academy. Instead. Teachers have developed assessments which require students to use information in contexts similar to those they will encounter as professionals. These assessments consist of: performance analysis, thinking logs, learning journals and portfolios.

Schedule

A unique academic schedule features Exploration Days (every sixth school day) instead of regular classes. Students participate in independent and group research, special seminars and symposia, academic field trips and mentorships with industry. The students do not attend classes on the weekends. The academic schedule rotates through the week which keeps the students actively involved in their schedule.

Requirements

Students must earn 16 academic credits to graduate from the Illinois Mathematics and Science Academy. These 16 credits consist of: 8 in Science and Math, 2.5 in Social Science, 3 in English, 2 in Foreign Languages and .5 in the Fine Arts. Further requirements of IMSA students are: two semesters of physical/health education, 80 hours of community service, 300 hours of campus work service and they must pass the Illinois consumer education exam.

Faculty

The Illinois Mathematics and Science Academy conducts national searches for exemplary faculty and staff. The average teaching experience is approximately 13 years and nearly 30% hold Ph.D.'s. The faculty includes several Presidential Award winners, noted authors, fellowship recipients and a full-time resident scientist (IMSA, 1993, p. 7).

Information and Communications

IMSA combines the resources traditionally found in academic libraries, computer centers and audio/visual services into a single, integrated information and communications system. Their current resources include: 27,000 monograph volumes, 150 periodicals, on-line and CD-ROM data bases along with automated retrieval systems. There are also more than 500 micro-computers with access to local and wide-area computer networks, the Toyota Video Production Laboratory, a 750 volume curriculum-based video collection, satellite-based communications and a tele-communications instructional consortium classroom.

Admissions Procedures

Recruitment

The academy actively seeks out potential students through outreach programs such as the IMSA Challenge, The Early Involvement Program and by direct presentations to students.

Application

Students must be residents of Illinois and at grade 9 level of education to apply for admission. Potential students are required to fill out an application form which must include: evaluation letters from math, science and English teachers, evaluation letter from a counselor or the principal, three previous years of grade reports, current academic year SAT scores and a possible interview with an admissions review board.

Selection

A three member board of educators and professionals review each application. The selection is based on potential for mathematical and scientific reasoning, communication skill, interpersonal skills and skill application. The board looks for exceptional individuals who may or may not have high grades. There is a waiting list and those students denied admission can appeal for a review of their application. IMSA is also involved with sharing information with teachers as well as students through their StateWide Leadership Programs. Further infromation on these programs can be obtained by

contacting the Illinois Mathematics and Science Academy.

StateWide Leadership Program

IMPACT II

This group is a teacher-to-teacher network to enhance mathematics and science education in Illinois.

IMSA Leadership Conference

Regional working conferences focus on understanding and using the critical state and national reports shaping change in mathematics and science education.

Project A.S.S.I.S.T.

This program consists of workshops based on superconductivity for secondary schools.

IMSA Challenge Program

This outreach program takes place in the summer and recruits minority students from across the state of Illinois in grades 7 through 9. Students participate in problem solving activities and live on campus for one week.

District Learning Leadership Teams

These are thirty Illinois school district teams that develop, implement and evaluate curriculum, instructional strategies and assessment procedures.

These various outreach programs exist to meet the goals set forth by IMSA's mission statement. The academy must share their findings with other educational institutions in Illinois. This is one of the main reasons the Illinois Mathematics and Science Academy was created and why it continues to survive. IMSA accomplishes this goal through these direct experience outreach programs and with the use of video production.

Toyota Video Production Laboratory

The Video Production Laboratory was developed in 1990 with limited equipment. In 1991, Toyota donated a large sum of money to build a fully operational laboratory. The Toyota Video Production Laboratory was created with three main functions in mind. One, create videos to share IMSA findings and activities with other educational and industrial institutions in Illinois. Two, expose young Illinois students to advanced media technology which would allow them to express ideas through visual sources. Three, support student and staff development through media technology such as the telecommunication instructional consortium classroom and distance learning.

Facilities

Television Studio

The set consists of standard features of furniture and background as well as a fully equipped lighting grid. There are two HI-8 mm cameras which can become mobile for field shooting.

Production Control Room

This area contains: a 3/4" A-B roll edit suite with two time base correctors, a video toaster which is used as a switcher,

character generator, animator and special effects machine. There is also one 1/2" "cuts only" edit suite with kyron machine.

Audio Production

This area is a part of the production control room and consists of: dual cassette deck, CD player, reel-to-reel tape machine, microphone inputs MIDI sequencer and a sixteen source sound board.

All the equipment is in good shape and produces above average videotape. The equipment is in need of some upgrading to increase the quality to higher broadcast abilities. However, this lab is in constant use and growing every year.

Office of the Alliance

The Office of the Alliance is responsible for conducting a majority of the outreach programs at the Illinois Mathematics and Science Academy and has been the most active in producing videos for distribution. This department hires consultants to produce and direct video projects which are shared with other educational institutions in Illinois.

The Journey

In the beginning

The Office of the Alliance utilizes videos to meet one of the major goals of IMSA's mission, which is to share information with other educational institutions in Illinois. In the beginning, this goal was accomplished by merely recording events and sending video copies of the event to various educational communities in Illinois. This was and is currently being done to allow people that could not attend the event a chance to share information from the event by viewing the video.

An example of this event driven video program is the Dr. Edward Teller Leadership Lecture (Layng, 1992a). It is an hour long "talking head's" format video program capturing the special and rare event of a lecture by a famed physicist as well as Atom bomb co-creator, Dr. Edward Teller. This video was produced for archival purposes and has been extremely useful in sharing information but the program has a tendency to drag a bit. There is a strong desire to improve production and visual quality of future projects by producing more original programs and less event driven videos.

The Next Step

The Illinois Mathematics and Science Academy's next move on their journey into video production was to create a series from the 1993 Leadership Conference (Layng, 1993b). The video program was still event driven but now an introduction, credits, cut-ins and cut-aways of the audience picked up the pace of the video and made it more interesting to watch.

The Evolution Continues

The evolution of IMSA's use of video continued with another project called the 1992 Summer Challenge program (Layng, 1992b). IMSA students shot video of minority students, grades 7 - 9 from across Illinois, participating in a week long problem solving activity. The project consisted of editing over forty

hours of footage into a one hour overview program. The video was produced with stand-alone units that made up the whole program. These units can be displayed separately to explain a specific point about problem-based learning. This video was also event driven but now IMSA was producing more material rather than just recording it.

The Original Programming Step

The Illinois Mathematics and Science Academy currently has reached the point of producing original programs scripted, shot and edited at the Toyota Video Production Laboratory. The result of this venture is a one hour interview format program called, "Jane's Baby - An Ill-structured Problem" (Layng, 1992a). The program is an informational tape on problem-based learning and uses footage of problem-based learning in action at a conference. IMSA has arrived at the stage of producing original programs that are not event driven.

The Journey Continues

The Office of the Alliance and other departments at IMSA are currently working on original programming to be distributed across Illinois. The Admissions office is producing a video tape on what it's like to be a Illinois Mathematics and Science Academy student and there are plans to send it to incoming students. The Alliance department is in the process of designing an interactive training program on problem-based learning from video generated at the 1993 Summer Challenge program.

Conclusion

The Illinois Mathematics and Science Academy is an innovative educational institution with unlimited possibilities. One of these possibilities is the increased use of visuals to share information and aid students in their quest to better understand the world.

Carl Sagan, member of IMSA National Advisory Board, described IMSA's impact on society best by saying, "Our future depends on producing and encouraging highly competent, ethically responsible young scientists, as well as much greater scientific literacy in the general public. The Illinois Mathematics and Science Academy in Aurora, Illinois, is dedicated to meeting this challenge... It is the gift from the people of Illinois to the human future" (IMSA, 1993, Pamphlet).

What better way to make the public more scientifically literate than by making them more visually literate through the continued use of visuals in the classroom and in training. It is only a start but IMSA's journey into video production has proven quite beneficial and will continue to make a difference in the Illinois educational environment.

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